

### REMARKS

Claims 1-15 are pending. Claims 7-15 have been withdrawn from consideration based on a restriction requirement. Claims 4 and 6 have been withdrawn from consideration by the Examiner as being drawn to a non-elected species. Claim 1 has been amended in this reply. No claims have been added or canceled. Claims 1-15 therefore will be pending upon the filing of this reply.

Claims 1-3 and 5 have been rejected under 35 U.S.C §112, second paragraph, as being indefinite. In particular, the Examiner asserts that it is unclear what depth is denoted by the term “approximately five pore plies” appearing in claim 1.

In response, Applicants respectfully direct the Examiner’s attention to page 8, paragraph 31 of the original application, which states: “[t]he powder particles of the layer 2 penetrate into the layer 3 up to a depth of about 2 pore plies, which corresponds to about 3  $\mu\text{m}$  . . . .” Applicants therefore respectfully submit that the meaning of the term “approximately one to approximately five pore plies” appearing in claim 1 is clear. In the interest of advancing prosecution of the application, however, claim 1 has been amended to express this range of dimensions in microns rather than pore plies. Applicants respectfully submit that this amendment does not narrow the scope of claim 1. Withdrawal of the rejection of claim 1 (and claims 2, 3, and 5, which depend therefrom) under 35 U.S.C §112, second paragraph is respectfully requested.

Claims 1-3 and 5 have been rejected under 35 U.S.C §103(a) as being obvious over European patent application 0381812 (“the 812 application”) in view of U.S. patent no. 5,342,431 (“the 431 patent”). Applicants respectfully submit that claims 1-3 and 5 are patentably distinct from the cited references, for at least the following reasons.

Claim 1 of the present application recites “the pore size of the first layer is within a range of approximately 0.01  $\mu\text{m}$  to approximately 1  $\mu\text{m}$ .” The Examiner asserts that the layer of metal oxide powder, e.g., titania, of the filter disclosed in the 812 application meet this limitation, because the layer is formed from particles having a size between approximately 0.2 to 1 micron. Office action at pg. 3, lines 4-7. Applicants respectfully disagree. Applicants respectfully submit that the pore size is determined, to a large extent, by the manufacturing process used to form the layer.

The manufacturing process disclosed in the 812 patent is substantially different from that disclosed in the present application. The 812 patent teaches that the layer of metal oxide, e.g., titania, is formed by applying the metal oxide in the form of a slurry, and particularly as an aqueous slurry, to a porous metal support. 812 application at pg. 3, lines 35, 36.

The present application, by contrast, teaches that the first layer of the filter can be formed using a non-aqueous metal-oxide suspension. Moreover, the examples presented in the present application disclose the use of terpinol and polyethylenimine as part of the metal-oxide suspension. Original application at ¶¶ 32-37. These substances influence the pore size of the metal-oxide layer. Thus, the exemplary method and materials disclosed in the present application will produce a layer having substantially different pore sizes than a layer produced using the method and materials disclosed in the 812 patent. Applicants therefore respectfully submit that the 812 application neither teaches nor suggests a first layer having a pore size within a range of approximately 0.01 micron to approximately 1 micron.

Claim 1 of the present application also recites “a thickness of the first layer is within a range of approximately 0.5  $\mu\text{m}$  to approximately 50  $\mu\text{m}$ .” The Examiner acknowledges that the 812 application is silent concerning the thickness of the metal oxide layer, which the Examiner has characterized as a first layer as recited in claim 1 of the present application. Office action at pg. 4, lines 3-5. The Examiner asserts that it would have been obvious to modify the thickness of the metal oxide layer of the filter of the 812 application, to optimize the strength of the filter with respect to the pressure drop across the filter. Applicants respectfully disagree.

The specification of the present application teaches that the *combination* of the thickness and pore size of the first layer, both of which are recited in claim 1, are critical to achieving a desired flow resistance through the filter. Original application at ¶ 11. Applicants therefore respectfully submit that one of ordinary skill in the art of filter design would not have found it obvious to modify the thickness of the metal oxide layer of the filter of the 812 application to within a range of approximately 0.5 microns to approximately 50 microns.

Claim 1 of the present application, as amended herein, also recites “the metal oxide material of the first layer penetrates into the second layer to a depth of approximately 1.5  $\mu\text{m}$  to approximately 7.5  $\mu\text{m}$ .” This relatively limited penetration depth helps to form a well-

defined transition between the first and second layers, which in turn permits the flow resistance of the filter to be pre-defined. Original application at ¶ 8. *See also* Figure 1 of the original application.

The 812 application, by contrast, is silent regarding a penetration depth for the metal oxide particles into the adjacent layer. The 812 application merely teaches that the *overall* penetration of the metal oxide particles into the porous metal substrate can be between 30 and 100 microns. 812 application at pg. 4, lines 13, 14 and pg. 6, claims 1 and 10. The 812 application neither recognizes nor addresses the need for a clearly defined transition area between layers, to help define the flow resistance of the filter. Applicants therefore respectfully submit that the 812 application neither teaches nor suggests that metal oxide material of a first layer penetrates into a second layer to a depth of approximately 1.5 microns to approximately 7.5 microns.

Claim 1 of the present application also recites “a thickness of the second layer is within a range of approximately 5  $\mu\text{m}$  to approximately 300  $\mu\text{m}$ .” Applicants respectfully submit that the 812 application neither teaches nor suggests this limitation.

Example 1 of the 812 application discloses the use of a porous metal substrate in the form of a tube having a wall thickness of approximately 0.5625 cm, or 5,625 microns. 812 application at pg. 4, lines 20-23. As discussed above, the 812 application teaches that the metal oxide layer penetrates into the porous metal substrate to a depth of between 30 and 100 microns. Hence, to the extent the portion of the tube-wall thickness that is free of the metal oxide particles can be considered a “second layer,” the second layer has a thickness far greater than 300 microns. Applicants therefore respectfully submit that the 812 application neither teaches nor suggests that the thickness of the second layer is within a range of approximately 5 microns to approximately 300 microns.

The Examiner acknowledges that the 812 application fails to specify a third layer. Office action at pg. 3, line 20. The office action, however, refers to a “third layer including a coarse and porous body formed from metallic material” when discussing the 812 application. *Id.* at lines 10, 11. Applicants believe that this reference is an error, given the Examiner’s acknowledgement that the 812 patent fails to specify a third layer. Clarification is respectfully requested.

The 431 patent is silent regarding the above-discussed limitations of claim 1 of the present application. The 431 patent has been cited solely for the teaching of a filter having a third layer. Office action at pg. 3, lines 20-23 and pg. 6, lines, 1-3.

Applicants therefore respectfully submit that the 812 application and the 431 patent, either alone or in combination, neither teach nor suggest the following limitations recited in claim 1 of the present application:

the pore size of the first layer is within a range of approximately 0.01  $\mu\text{m}$  to approximately 1  $\mu\text{m}$ ;

a thickness of the first layer is within a range of approximately 0.5  $\mu\text{m}$  to approximately 50  $\mu\text{m}$ ;

the metal oxide material of the first layer penetrates into the second layer to a depth of approximately 1.5  $\mu\text{m}$  to approximately 7.5  $\mu\text{m}$ ; and

a thickness of the second layer is within a range of approximately 5  $\mu\text{m}$  to approximately 300  $\mu\text{m}$ .

Applicants therefore respectfully submit that claim 1 is patentably distinct from the combination of the 812 application and the 431 patent. Withdrawal of the rejection of claim 1 (and claims 2, 3, and 5, which depend therefrom) under 35 U.S.C §103(a) is respectfully requested.

Applicants respectfully request substantive examination of claims 4 and 6. The Examiner has acknowledged that claim 1, from which claims 2-6 depend, is generic *to claims 2-6*. Office action at pg. 2, lines 3, 4. Moreover, Applicants respectfully submit that claim 1 is allowable, for at least the reasons discussed above. Applicants therefore respectfully submit that claims 4 and 6 should be examined and allowed.

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**PATENT**

A notice of allowability is respectfully requested.

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